SIMON FRASER UNIVERSITY

MEMORANDUM

S.80-39

To Senate	From Senate Committee on Undergraduate Studies
Subject Mathematics Changes	Date 1980-03-27

Action taken by the Senate Committee on Undergraduate Studies at its meeting of March 11, 1980, gives rise to the following motion for action and report for information.

MOTION

That Senate approve and recommend approval to the Board of Governors as set forth in S.80-39 , the proposed new course Mathematics 216-3 Introduction to Computational Methods with the deletion of Mathematics 104-3 (Elementary Computational Methods).

FOR INFORMATION:

Under its delegated authority SCUS approved the change of vector for Mathematics 416-3 (Numerical Analysis II) from 3-1-0 to 3-0-0.

Dan R Birch

SIMON FRASER UNIVERSITY SCUS 80-12

MEMORANDUM

To H. M. Evans, Secretary, Senate Committee on Undergraduate Studies.	From N. Heath, Assistant to the Dean of Science
Subject Mathematics Curriculum Changes	Date 1980 03 04

At its meeting of 1980 02 20, the Faculty of Science approved the following motion:

"That the new course proposal MATH 216-3, the deletion of MATH 104-3 and a change in the course vector of MATH 416-3, as outlined in F-80-1 (attached documents), be approved and forwarded to SCUS and Senate for consideration and approval."

N. Heath

NH/rw

attachments

SIMON FRASER UNIVERSITY

F-80-1

MEMORANDUM

To: Dr. C.L. Kemp, Chairman Faculty of Science Undergraduate Curriculum Committee	From: G.A.C. Graham, Chairman Undergraduate Studies Committee Mathematics Department
Subject: MATH 216-3, INTRODUCTION TO COMPUTATIONAL METHODS	Date: November 6, 1979

The Mathematics Department has approved the introduction of MATH 216-3, Introduction to Computational Methods (3-1-0). This represents a revision of MATH 104-3, Elementary Computational Methods (2-0-2), which is to be dropped upon introducing the new course.

The Department of Computing Science has agreed that MATH 216-3 will be listed as a lower division requirement for students who plan to undertake a major or honors in Computing Science (see page 298 of 79-80 edition of SFU calendar.)

Also, the Mathematics Department has approved a vector change for MATH 416-3, Numerical Analysis II.

These two proposals may now be taken before your committee for its approval.

Approved by Faculty U.C.C., 1979 12 14. NH

G.A.C. Graham

GACG/dr

Encl: Course proposal form and syllabus for Math 216-3
Course proposal form for Math 416-3

cc: Dr. Wo Shun Luk, Chairman
Undergraduate Curriculum Committee
Department of Computing Science

Dr. M. Singh, Chairman, Mathematics

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

Calendar Information

Department: *MATHEMATICS*

Abbreviation Code: *MATH* Course Number: *216* Credit Hours: *3* Vector: *3-1-0*

Title of Course: *INTRODUCTION TO COMPUTATIONAL METHODS*

Calendar Description of Course:

An introduction to some of the main areas of numerical computation such as nonlinear equations, systems of linear equations, curve fitting, optimization, integration, statistics. Assignments emphasize use of computers.

Nature of Course *LECTURE/TUTORIAL*

Prerequisites (or special instructions): *MATH 151-3 or 154-3 or 157-3 (or 150-3), CMPT 103-3 (except COBOL).*

Students who have obtained credit for MATH 104-3 may not receive credit for MATH 216-3.
Students who have taken or are taking MATH 316-3 for credit may not take Math 216-3 for credit.

What course (courses), if any, is being dropped from the calendar if this course is approved: *MATH 104-3 vector: 2-0-2*

2. Scheduling

How frequently will the course be offered? *Once per year*

Semester in which the course will first be offered? *SPRING 81*

Which of your present faculty would be available to make the proposed offering possible: *Drs. Russell, Pechlaner and others.*

Objectives of the Course

To provide students having basic calculus with a background in many of the modern methods of computation. Students who anticipate using the computer for data analysis, numerical simulation, and numerical approximation in in general will be given an introductory description of available algorithms and their possible pitfalls.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty
Staff
Library
Audio Visual
Space
Equipment

NONE

Use is to be made of resources generated by changing the vector for Math 416-3 from 3-1-0 to 3-0-0.

5. Approval

Date: *Nov. 6, 1979* *3 March '80* *MAR 11 80*

Department Chairman Dean Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

MATH 216-3

INTRODUCTION TO COMPUTATIONAL METHODS

1. Errors arising in machine computations - roundoff and truncation error with examples (e.g. series summation, function evaluation) (1 week)
2. Approximation - interpolation polynomial (Lagrange and Newton forms), piecewise polynomials (cubic splines). (2 weeks)
3. Iterative algorithms and solutions to nonlinear equations (Secant, Newton methods) (2 weeks)
4. Probabilistic simulation - random number generators, 3 examples of simulation, stochastic processes - Monte Carlo methods, inventory analysis, and queueing. (1½ wks.)
5. Deterministic simulation - 2 examples of implicit solution of differential equations (such as predator-prey and moon-landing models) (1 week)
6. Linear algebra - elimination methods, curve fitting by interpolation, linear regression. (2½ wks)
7. Optimization (1½ wks)
8. Numerical integration - motivate finding area under curve, Gaussian quadrature, Simpson's rule, adaptive quadrature (1½ wks)

PREREQUISITES: MATH 151-3 or 154-3 or 157-3; CMPT 103-3 (except COBOL)

Students who have obtained credit for MATH 104-3 may not receive credit for MATH 216-3. Students who have taken or are taking MATH 316-3 for credit may not take Math 216-3 for credit.

TEXTBOOK: Elementary Computer Applications in Science, Engineering and Business
by Ian Barrodale, Frank D.W. Roberts and Byron L. Ehle
Published by John Wiley & Sons (1971).

10/79

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Mr. Larry Thomas Library	From: G.A.C. Graham, Chairman Undergraduate Studies Committee Mathematics Department
Subject: MATH 216-3, Introduction to Computational Methods	Date: November 15, 1979

The Mathematics Department has approved the introduction of the course

MATH 216-3, Introduction to Computational Methods

which is soon to be taken before the Faculty of Science Undergraduate Curriculum Committee for its approval.

Math 216-3 represents a revision and slight upgrading of our present course Math 104-3, Elementary Computational Methods, which is to be dropped upon approval by Senate of the new course. Math 216-3 will rely on the same library resources as Math 104-3 did and I beleive they are quite adequate.

Would you please provide confirmation that the library resources are adequate in the area covered by Math 216-3. Thanks.

G.A.C. Graham

GACG/dr

cc: Mr. Nick Heath
Dean of Science Office

Encl.

I have discussed this with Ed Weinstein, Sciences Librarian, and we agree that no new library resources are required to support Math 216-3.

Larry Thomas
21 N 79

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM

VECTOR CHANGE ONLY

Calendar Information

Department: MATHEMATICS

Abbreviation Code: MATH Course Number: 416 Credit Hours: 3 Vector: 3-0-0

Title of Course: NUMERICAL ANALYSIS II

Calendar Description of Course:

Same

Nature of Course Same

Prerequisites (or special instructions): Same

What course (courses), if any, is being dropped from the calendar if this course is approved:

N/A

2. Scheduling

How frequently will the course be offered? Same

Semester in which the course will first be offered?

Which of your present faculty would be available to make the proposed offering possible:

Same

Objectives of the Course

The expected number of students in the course and the level and nature of the material make formal tutorials unnecessary.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

5. Approval

Date: Nov. 6, 1979 3 March '80

Department Chairman Dean Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).